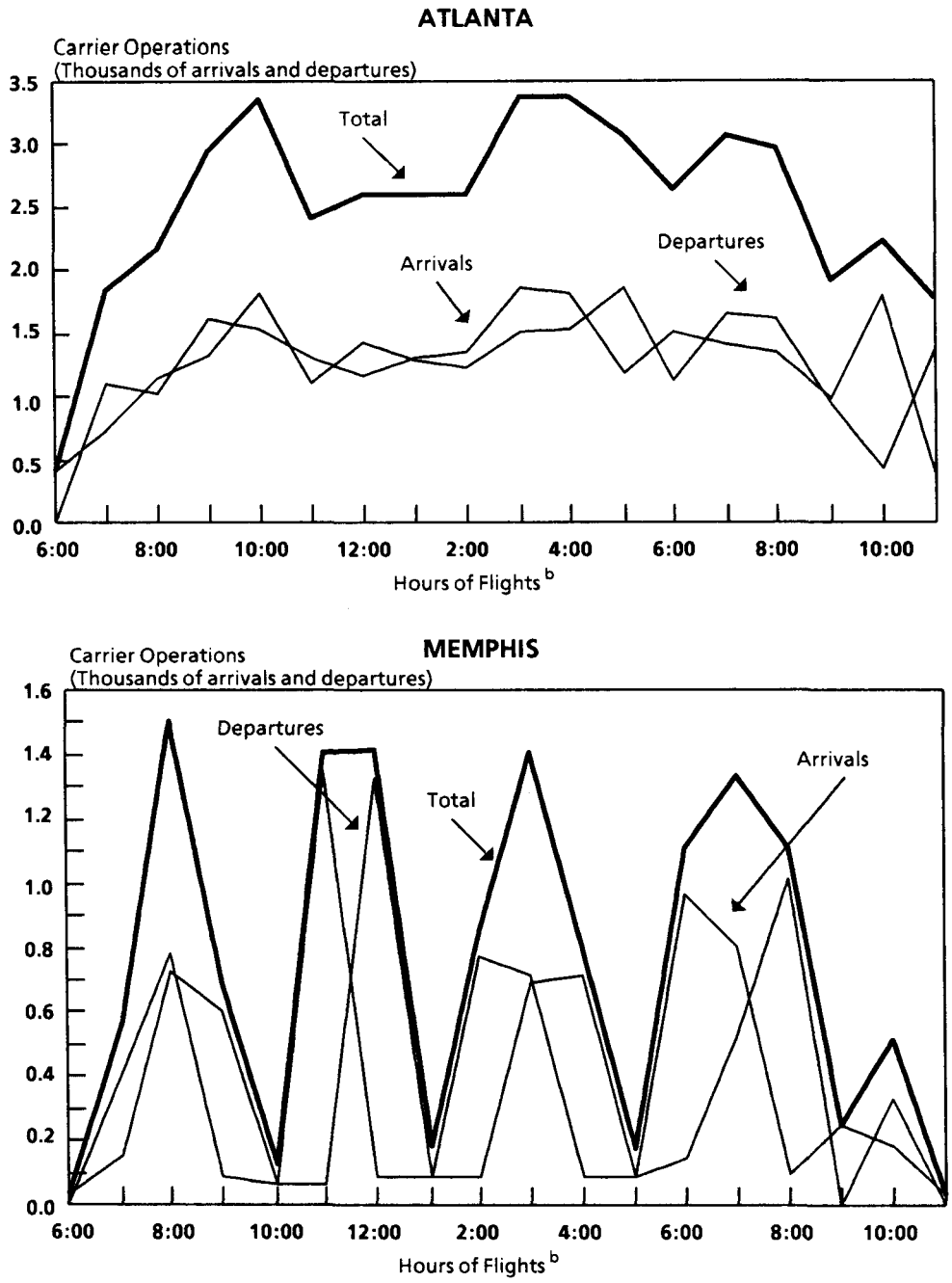
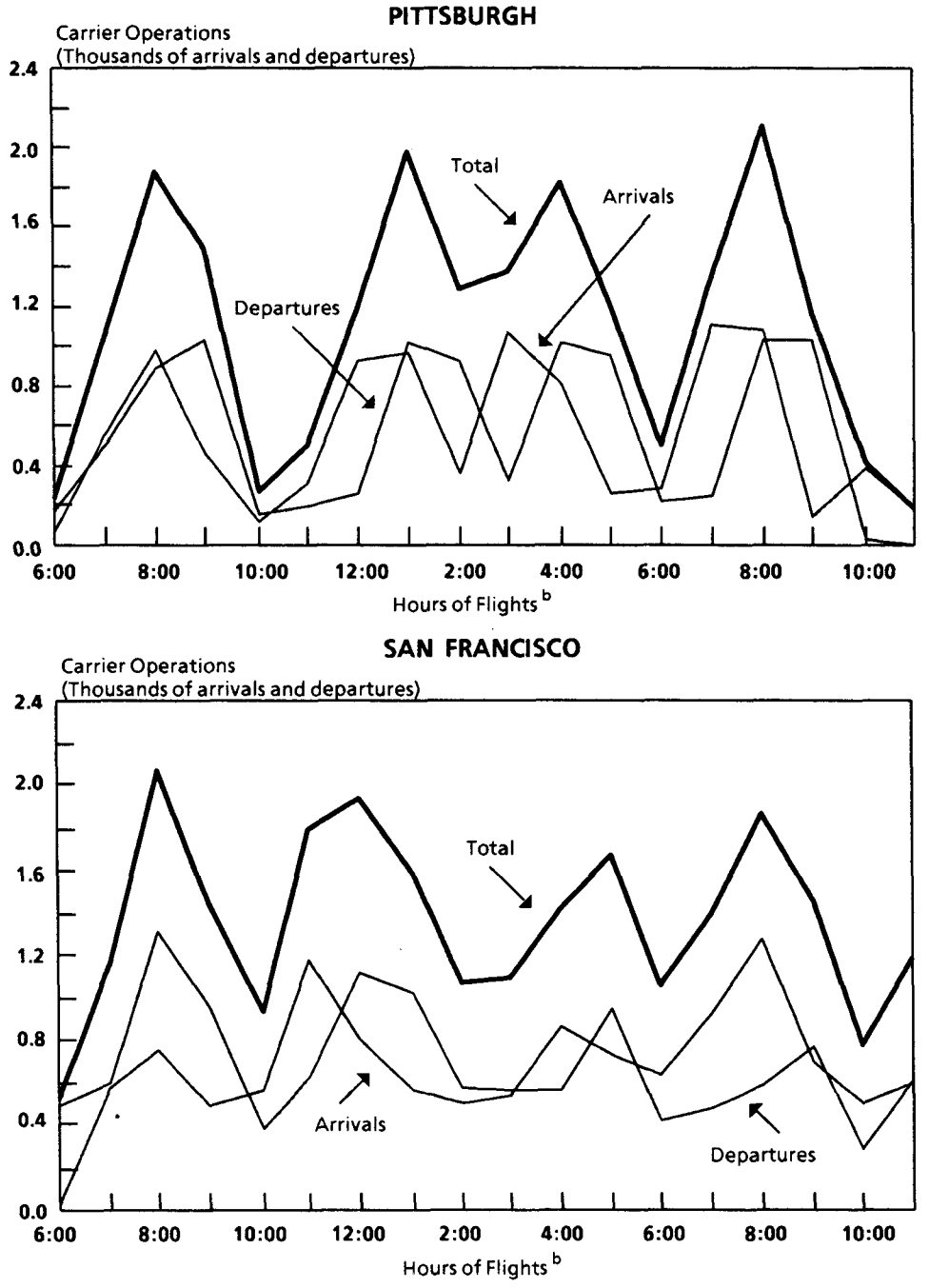
Figure 6.
Flight Operations of 14 Reporting Air Carriers, October 1987 [a]



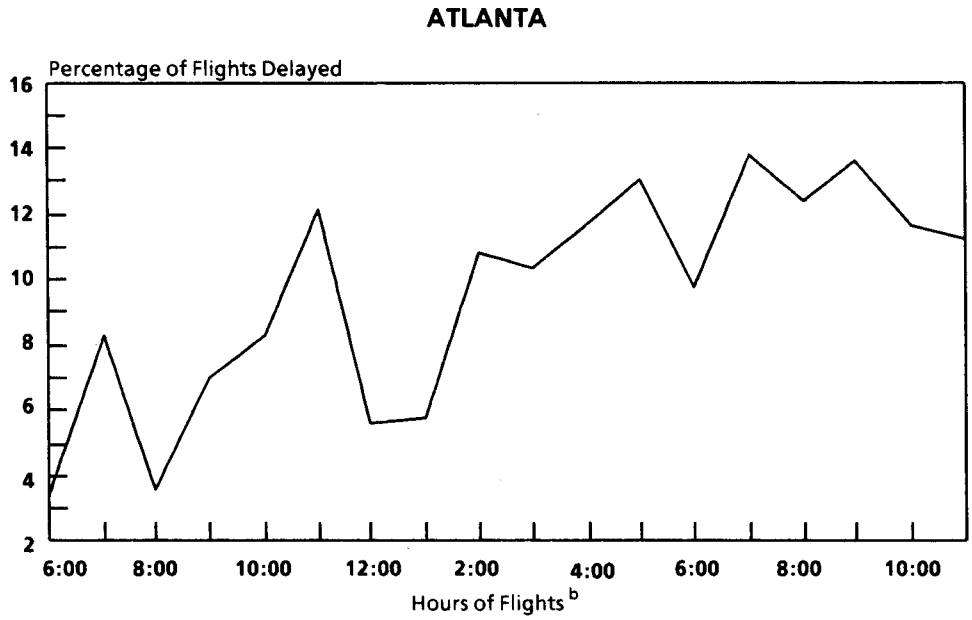
SOURCE: Congressional Budget Office, from Department of Transportation data.

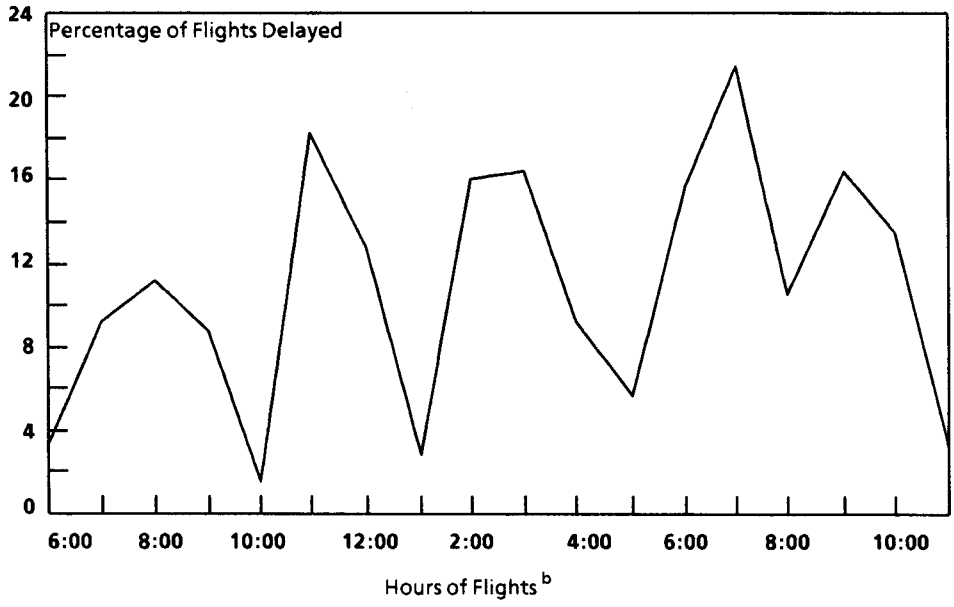
Figure 6. Continued



a. Major air carriers are required to report operations, delays and other consumer information to the Department of Transportation.
b. The 11:00 p.m. period includes flights from 11:00 p.m. until 5:59 a.m.

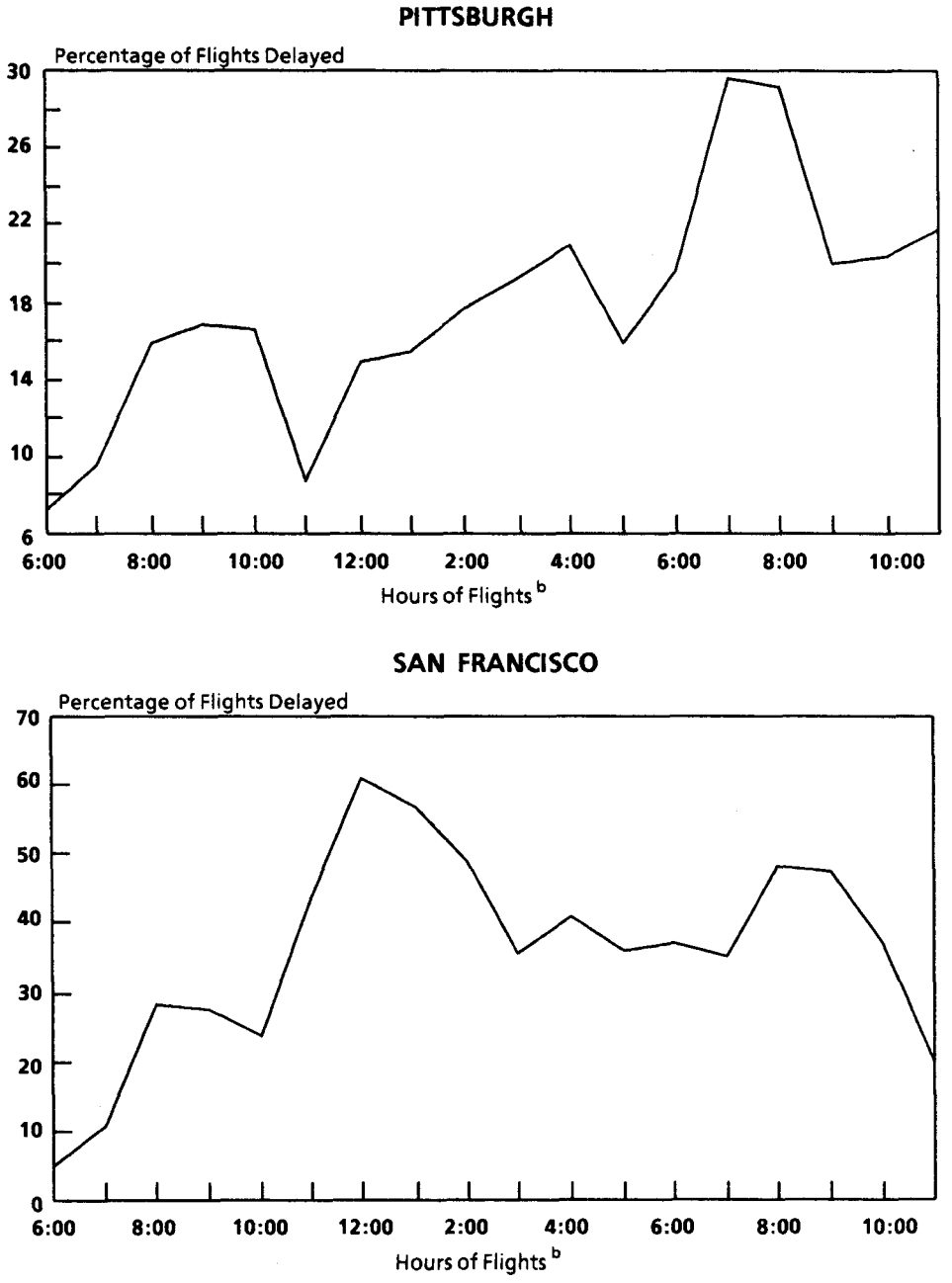
Figure 7.
Flight Delays of 14 Reporting Air Carriers, October 1987 [a]





SOURCE: Congressional Budget Office, from Department of Transportation data.

Figure 7.
Continued



a. Major air carriers required to report operations, delays and other consumer information to the Department of Transportation.
b. The 11:00 p.m. period includes flights from 11:00 p.m. until 5:59 a.m.

capacity in bad weather when airport capacity is most constrained; and reductions in the standards governing simultaneous approaches to parallel runways could also be used to increase capacity. But microwave landing systems raise concerns about capability and cost since they require installing expensive equipment on every airplane, and parallel approaches may entail safety problems. Airlines might respond to delays by substituting larger, wide-bodied aircraft that would permit airports to handle more passengers per flight.10/

MANAGEMENT OF CONGESTION IN THE AVIATION SYSTEM

Congestion in the airport and airway systems results from the interaction of many factors. The combination of fare decreases, hubbing, and sustained economic growth over the last five years has led to increased air travel, while limitations of current air traffic control equipment, physical constraints on airport growth, and long lead times for airport expansion have held back increases in system capacity. So far, congestion has been managed principally through administrative control of air traffic, more intensive use of capacity, and the dissemination of consumer information. Since the prospects for expanding airports are poor, more effective means of handling the congestion need to be found.

Administrative Control. Administrative control has mainly taken the form of slot allocations at airports. Slots are rights to use the air traffic control system to take off or land. Slot restrictions were first instituted at five airports (Washington National, Chicago O'Hare, New York LaGuardia and Kennedy, and Newark International) in 1968 in response to congestion. Controls were soon dropped at Newark, but have remained at the other four airports because of continued concerns about congestion as well as for other reasons such as noise. Slots were allocated among large scheduled aircraft, scheduled commuter aircraft, and general aviation. In each category, slots were allocated

10. For a fuller discussion of operational and technological possibilities for increasing airport and airway capacity, see Office of Technology Assessment, *Airport System Development* (August 1984).

to particular users. 11/ Following the traffic controllers' strike in 1981, slot allocations were extended to an additional 18 major airports for two years. In 1986, the Department of Transportation permitted carriers to buy and sell these slots.

Using slots to limit congestion, even with a resale market, poses problems for competition. It can impede entry to a market. For example, a carrier seeking to offer service between Chicago and New York with four daily round trip flights would need to purchase 16 slots. The times of these slots would have to permit the coordination of arrivals and departures as well as allow the carrier to offer a convenient schedule of flights. Since there are only a few carriers offering slots for sale at any given time, securing the necessary operating rights might be extremely difficult.

A second form of administrative control is the shifting of hub schedules at an airport. The Department of Transportation granted antitrust immunity to airlines, permitting them to coordinate changes in their schedules in order to relieve congestion at peak hours at several airports. Minor changes in the schedules of large numbers of planes can help alleviate delays. Such rescheduling has apparently offered at least temporary relief at Atlanta, Chicago O'Hare, Dallas/Ft. Worth, Newark, and Philadelphia.

Another strategy has been to require the airlines to provide more realistic departure schedules and to publish information regarding average delays on specific flights and in specific markets and also about the on-time performance of carriers. This kind of information may shift demand away from flights and carriers that are chronically late. And such shifts in demand may give airlines an incentive to adjust their schedules accordingly.

While these actions have ameliorated some of the effects of congestion, they certainly have not eliminated it. Moreover, they fail to address the long-run problem of allocating aviation system capacity. There is every reason to believe that the problem of congestion will be-

11. Initially the airlines met, under antitrust immunity granted by the CAB, to decide the allocation of air carrier slots unanimously among themselves. This system broke down with open entry under deregulation. The Federal Aviation Administration subsequently had to take a more active role in distributing slots. This included taking slots from member carriers and then distributing them by lottery to new entrants and permitting carriers to buy and sell the slots.

come worse as air traffic continues to grow faster than the aviation system. The next chapter looks at options that might be considered in dealing with this problem.

CHAPTER IV

OPTIONS FOR INCREASING COMPETITION AND REDUCING CONGESTION

This study has shown that deregulation has reduced the cost of air travel and increased its convenience. But consolidation within the industry has led to fears that competition may be reduced and some of the benefits of deregulation lost. A more certain threat to those benefits lies in the growing congestion of the airways and airports. Congestion not only causes delays; it may limit entry into new markets, and thus itself reduce competition.

When the Civil Aeronautics Board regulated the industry, it drew upon its own view of fairness and efficiency in shaping the route networks and the fare structure of the airlines. The outcome was a high-cost transportation system that did not respond well to changing needs. Since deregulation, the Federal Aviation Administration has attempted to develop a system that can accommodate all potential users without regard to the additional costs they impose on the system. This policy is at least partly responsible for the current problems of congestion and delay.

Policies to deal with congestion or a lack of competition should be aimed at the source of the perceived problem. To the extent that frequent flyer programs, computer reservation systems, and the prohibition against foreign carriers serving domestic markets limit entry, policies that lessen these barriers may serve to increase competition. Similarly, the most expeditious solution to the problem of congestion might be to make users of the aviation system pay the costs they impose on it.

INCREASING COMPETITION IN THE INDUSTRY

The advocates of deregulation believed that entry of new firms into existing markets, and the threat of entry, would discipline the setting of fares. But developments under deregulation have made entry more

difficult than many envisioned. No one foresaw the important roles that hub-and-spoke route networks, frequent flyer programs, and computer reservation systems would come to play. These developments seem to give large carriers a competitive advantage, and may have helped to precipitate the recent merger wave. The Congress may want to consider policies aimed at lessening these advantages. Some have even maintained that the consolidation warrants a return to some kind of fare regulation. Fare regulation, however, would probably create far more problems than it would solve.

The Issue of Fare Regulation

At present, overall competition within the industry seems still to be reasonably vigorous. Moreover, the industry accommodates a mix of carriers with different cost structures and different market strategies. Reinstating fare regulation would thus be unlikely to add much to the industry's performance. Given the difficulties in regulating fares, the costs would almost certainly be quite large.

There is no simple way to regulate fares. Perhaps the most straightforward method would be to prohibit carriers in each market from charging more than a given price. The Civil Aeronautics Board used such maximum fare regulation in its last years of regulatory authority. But the complex fare structure that has evolved under deregulation would make determining reasonable maximum fares in the various markets a difficult task. Moreover, these maximums might not have much effect since over 90 percent of air travel occurs on some kind of discount fare. To reinstitute fare regulation, therefore, the government would have to undertake detailed investigations of airline costs and passenger demand in order to determine the "correct" level and structure of fares. Forty years of CAB history vividly demonstrated the problems of such a policy.

A less intrusive regulatory approach might attempt to constrain fares by requiring carriers to make all their fares available on a one-way basis. Incumbent carriers have used round-trip fares with advance purchase and minimum stay requirements as a way of meeting competition from new, low-cost carriers. These restrictions have proved to be effective in segmenting the market by distinguishing time-sensitive passengers--most often business travelers--from leisure

passengers. In this way, the incumbents have been able to target their price response to the most price-sensitive passengers, who are generally most likely to use the services of the new entrant.

Requiring carriers to make all fares available on a one-way basis would limit the ability of incumbents to respond as selectively to the lower fares of new entrants. Carriers could continue to charge different fares for different flights, and fares could also vary depending on how long in advance passengers made their reservations, but carriers could not charge different passengers different fares based on their lengths of stay at their destinations. Since many business travelers can purchase tickets well before their departure, and can travel at off-peak times, such a requirement would limit the ability of carriers to target only leisure passengers.

Requiring carriers to offer only one-way fares might raise a number of problems. First, it would eliminate some important benefits that come from airlines' being able to distinguish among passengers: by varying the mix of passengers on their flights, carriers can increase the percentage of seats they fill. This helps airlines provide frequent service, which is especially valuable to time-sensitive passengers. Distinguishing passengers also helps airlines increase the likelihood that time-sensitive passengers can get seats on their preferred flights.1/ In addition, minimum-stay requirements allow carriers to restrict fare cuts to the most price-sensitive passengers, and thus increase the profitability of offering low fares to these passengers. Finally, as with any of the options discussed here, requiring one-way fares might not stimulate much additional entry since a variety of factors apparently limit entry in the deregulated environment.

Frequent Flyer Programs

Frequent flyer programs can also make entry difficult. This is especially the case when a small carrier tries to begin service at an airport where a larger carrier operates a hub. Proposals have been made to ban frequent flyer programs or tax them, although there may be problems with both proposals.

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1. See Robert Frank, "When Are Price Differentials Discriminatory?" *Journal of Policy Analysis and Management* (Winter 1983).

Banning frequent flyer programs would, in the short run at least, be almost certain to increase the effective price of air transportation. Frequent flyer programs are essentially rebates, and carriers compete with one another in the size of their rebates.2/ Accordingly, carriers would have little incentive to translate any savings from ending these programs into price cuts. The reason for establishing frequent flyer programs was to make passengers reluctant to use other airlines, and, since a price cut can be quickly matched, it would do little to increase brand loyalty. Instead, any increased profits generated by ending the frequent flyer program would more likely be dissipated through increases in advertising or in service amenities. To the extent that ending the frequent flyer program stimulated entry, it would encourage increased competition and lower fares.3/

A less drastic step would be to tax travel awards made under frequent flyer programs. People who travel extensively on business tend to be among the most active participants in the programs. Although their employers pay for the transportation, the airlines pay the travel awards--that is, the rebates--directly to the travelers. In effect, the employers are giving the travel awards to the employees; hence the awards should be treated as part of employee compensation and they should be taxed accordingly.

In the case of passengers who accumulate the necessary mileage for free travel while flying for personal reasons, the travel award is not part of employee compensation but simply a price cut. To avoid taxation in this case, people would have to demonstrate that they had personally purchased the air transportation. This could involve significant record-keeping costs. In any case, taxing the travel awards would only reduce, but not eliminate, the advantages that the frequent flyer programs provide larger carriers.

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2. For example, in the beginning of 1988, several major carriers reduced the price of air travel by granting triple miles throughout the year to passengers who flew on those carriers in the first three months of 1988.

3. Still another option would be to allow passengers to transfer their accumulated mileage among themselves. This would lessen the tendency of a passenger to make a commitment to only one carrier's flights. If an active secondary market developed, however, there would be little value to carriers in maintaining frequent flyer programs. See Severin Borenstein, "Hubs and High Fares: Airport Dominance and Market Power in the U.S. Airline Industry," discussion paper, Institute of Public Policy Studies, University of Michigan (March 1988).

Computer Reservation Systems

Like frequent flyer programs, computer reservation systems (CRS) provide distinct marketing advantages to a number of large carriers. Although the systems greatly increase efficiency, airline ownership is not necessary for both airlines and travel agents to benefit from them.

Airlines receive two primary benefits from owning a CRS. An owner can charge high booking fees to other airlines for reservations made on their flights. In addition, a travel agent is apparently more likely to book flights on a particular carrier if the agent uses that airline's CRS. This may stem partly from the ability of CRS owners to use their systems to monitor travel agent behavior and then design commission schedules that are effective in influencing agent recommendations.

One way to prevent carriers from gaining an advantage from computer reservation systems would be to prohibit individual carriers or groups of carriers from owning them. The systems could be owned by nonairline companies or by an industrywide group of airlines. If the government merely prohibited airlines from owning them, nonairline owners would still be able to charge booking fees that exceed costs. If the government mandated an industrywide system, some way would have to be found of combining the existing systems and compensating the current owners. Moreover, forcing divestiture might adversely affect domestic carriers competing in international markets, since foreign carriers would continue to be able to use their systems to influence the behavior of travel agents in their home markets.

An alternative approach would be for the government to regulate the way in which CRS owners and travel agents are compensated. This might eliminate some of the advantages arising from carrier ownership of the systems. At the same time, it would avoid the need for divestiture, and it would not require the government to set booking fees or commission rates.

Booking Fees. The fees that an airline pays a CRS owner are often high because the airlines that pay the fees have virtually no role in determining which CRS an agent uses. One way to increase competition in the establishment of booking fees would be to require travel agents to pay all fees associated with the operation of a computer

reservation system. An agent who had to pay the booking fees would necessarily consider the level of these fees in choosing which CRS to use. Under such a rule, commission rates would almost certainly increase to reflect the agents' higher costs of doing business. Yet the cost to a carrier of accepting a reservation through a travel agent--including the commission and the booking fee--would most likely decline. If the booking fees did not decline or carrier costs did not reflect the lower fees, such a regulatory change would not have accomplished its objective.

Commission Rates. Computer reservation systems provide their owners with information on travel agent booking practices that enables them to tailor their commission rates to individual agents. One way to prevent CRS owners from achieving this advantage would be to require that differences in commission rates paid to travel agents for a given fare on a given flight be justified by differences in costs. There would, however, be no need to require such a justification in the case of differences in commission rates for different fare categories, for different markets, or even for different flights. Such a regulation would be likely to end most commission overrides. To the extent that small carriers must pay commission overrides on a larger percentage of their flights, such a rule would decrease the costs of these carriers relative to their larger rivals.

Even this limited form of commission regulation would present a number of difficulties. Most significantly, it would have to be accompanied by a rule that required carriers to adhere to a price list. If an airline was able to charge different travel agents different fares for the same transportation, it could effectively achieve the same results as if it were permitted unlimited use of commission overrides. Moreover, carriers might be able to circumvent the rule and achieve the same results with different marketing strategies that did not involve overrides. Finally, such a rule might actually constrain competition if it made entry more difficult by preventing carriers from developing special commission packages.

Permitting Foreign Competition

The Federal Aviation Act prohibits foreign carriers from engaging in cabotage--that is, providing domestic air transportation.4/ This prohibition applies even to flights that a foreign carrier already operates between two U.S. cities. For example, Air France operates a flight from Paris to New York that continues on to Washington, D.C. Air France cannot, however, carry domestic passengers traveling between New York and Washington.

The development of hub-and-spoke route systems in domestic markets has been paralleled in international markets as well. Consequently, many foreign carriers would be eager to begin service in U.S. markets in order to provide connecting traffic for their international flights. In most cases, such service would be viable only if the foreign carriers could carry U.S. domestic traffic.

Allowing foreign carriers to provide domestic service would increase competition. It might also enable U.S. carriers to win similar rights in other countries. Currently, such rights are established in bilateral agreements. The United States would permit foreign carriers to operate in domestic markets only if it were able to secure reciprocity from the other countries. One problem is that the United States is much larger than most other nations. Therefore, to secure rights equivalent to a grant of cabotage in this country, it would have to obtain rights to carry traffic between foreign countries.5/

REDUCING CONGESTION

Congestion arises when more aircraft seek to land or take off within a given time period than the aviation system can expeditiously handle. One method used to allocate this excess demand has been delay. But

4. A carrier is considered foreign-owned if more than 25 percent of the company is owned by other than U.S. citizens. Service between the United States and foreign countries is governed by bilateral air service agreements. With a few exceptions, these agreements limit the routes between the two countries and the number of carriers on each route.

5. For a discussion of this issue, and a review of the recent history of U.S. international aviation policy, see Daniel Kasper, *Deregulation and Globalization: Liberalizing International Trade in Air Services* (Cambridge, Mass.: Ballinger, 1988).

delayed flights have not only brought complaints from airline passengers; they have imposed substantial costs on passengers and airlines alike. Efforts have also been made to reduce congestion through administrative methods, such as rationing takeoff and landing rights or forcing airlines to shift their schedules.

Other ways of reducing congestion would be to expand the peak capacity of the airports or to find better ways of managing the existing capacity. Expanding capacity is relatively expensive, and cannot be done quickly. Better management of the aviation system may offer a faster and cheaper remedy to the congestion problem.

Expanding Peak Capacity

Capacity limitations may occur in three parts of the aviation infrastructure:

- o En route traffic control--in the staffing and equipment of air route traffic control centers and flight service stations.
- o Airport and terminal traffic control--in equipment and staffing, as well as in approach and landing aids.
- o Airports--in the number and configuration of runways and taxiways, including visual landing aids, and in the passenger-processing capability of terminal buildings.

En Route, Terminal, and Airport Tower Traffic Control. En route traffic control causes very little congestion. Despite staffing shortages and equipment problems, capacity generally appears to be sufficient to provide adequate en route services. Moreover, the opening of new air routes often requires only procedural changes and training rather than an investment in capital equipment.

Terminal and airport control tower improvements would reduce congestion by permitting airports to accommodate more arriving and departing flights. At many congested airports, however, a significant expansion of control capacity may have to wait until the FAA completes its modernization of the air traffic control system. This modernization will improve traffic handling rates and streamline control

procedures. Apparently little can be done to speed the process, which is not scheduled for completion until 2000, although major elements will be finished during the 1990s.

Commercial Airports. The major source of congestion is the airports themselves. The expansion of runways, taxiways, landing aids, and terminals could reduce congestion at airports with sufficient control capacity to accommodate increased ground and air capacity. Expansion would not be effective elsewhere until the air traffic control modernization nears completion.

Federal aid could help finance airport expansion. The Congress could, for example, increase the proportion of federal grants to commercial airports for airport development. Thirty percent of federal airport grants currently go to noncommercial airports, although commercial airports are by far the most congested sector of the aviation system. In fact, the increased congestion in recent years has stemmed primarily from the growth in flights by commercial airlines, while noncommercial operations have been falling at an average annual rate of over 3 percent since 1980.6/ Expansion of reliever airports would probably do more to reduce congestion at existing noncommercial airports than at commercial airports.

Redirecting airport grants could provide up to $400 million a year in additional funds to help finance delay-reducing investment at commercial airports. In addition, the unobligated balance in the Airport and Airway Trust Fund could be used to fund projects of $1 billion a year between 1989 and 1993. This combination of funds from both sources would more than double the amount currently spent by the FAA on commercial airport expansion, and would make up a substantial share of the funds the FAA estimates are necessary to reduce airport congestion in the period 1986-1995.

Yet, the possibilities for increasing capacity at congested airports may not be very great, even in the long run. Capacity expansion invariably requires an increase in the number of runways, and at many congested airports it would be virtually impossible to add runways. Some airports, like Washington National and New York's LaGuardia,

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6. For a discussion of trends in general (noncommercial) aviation, see Department of Transportation, *FAA Aviation Forecasts, Fiscal Years 1987-1998*, FAA-APO-87-1 (February 1987).

have no space to build new runways. At others, noise and land-use concerns often provide a formidable obstacle. Even where cities are willing and able to expand their airports, construction will take from three to five years.

In any case, new construction would be a costly solution. Since congestion generally occurs during periods of peak demand, the new facilities would have little use during off-peak periods. Moreover, airlines might be reluctant to build the new terminals that airport expansion would require--especially when such an expansion would permit other airlines to establish competitive services.

Managing Capacity

The current policy of the FAA is to accommodate all potential users of the system, even though in the short term such a policy may result in substantial delays for air travelers. Over a longer period, this policy may require an aviation system that is far larger and more costly than needed. A more efficient and equitable way of managing capacity would be through cost-based pricing.

In a number of instances, congestion has required the government to ration the use of airports. In doing so, it has often made use of take-off and landing rights, or "slots." Since 1968, there have been limits on takeoff and landing rights at four airports--Chicago O'Hare, Washington National, and Kennedy and LaGuardia in New York. For two years following the controllers' strike, flight restrictions were imposed on the 22 busiest airports in order to match demand with the reduced airway capacity. Slots have generally been based on fixed capacity limits reflecting the number of operations during bad weather.

There are a number of problems in using slots to allocate capacity. In the first place, allocation of slots among the various users of the system--jet carriers, commuter airlines, and general aviation--has generally not been very responsive to changes in demand. Perhaps of even greater significance, the use of slots greatly increases the complexities of airline scheduling and the difficulties of entry into new markets. If slots cannot be bought and sold, it is very difficult for a carrier to begin or expand service at one of the slot-constrained airports. Although the FAA currently permits slot sales, the task of

assembling the necessary slots can be formidable for an airline introducing a new service. Frequently there are not enough sellers of slots to permit a carrier to acquire the necessary operating rights. The difficulties in using slots to ration capacity grow exponentially as the number of slot-restricted airports increases.

An alternative system of allocating access at congested airports would be to use the price system. During periods when traffic normally exceeds an airport's capacity, landing fees would be set at levels that would induce some aircraft operators to shift flights to other times or other airports. Such peak-load pricing would provide some indication of the value of expanding capacity. To the extent that airlines were willing to pay higher prices for peak flight times, the extra income could be used by the airports and the FAA to increase capacity. It could also provide some indication of whether, for example, increasing the number of air traffic controllers at a particular airport would be warranted. The fees would be adjusted periodically according to demand and supply conditions. Such fees could be charged in addition to existing aviation taxes or, alternatively, used in place of them.

Peak Surcharges for Air Traffic Control. Increasing the price of flying to a congested airport would decrease the number of flights at the airport. Faced with higher fees, some airlines would find it more profitable to use their equipment on other routes, while noncommercial users might decide to take commercial flights or to travel elsewhere. Increasing the fees by more at certain times than at others would give aircraft flying to the airport an incentive to change their schedules. In these ways, surcharges would reduce delay. Since relatively few commercial airports have a congestion problem--though these handle the majority of airline passengers--a surcharge would cause minimal disruption to aviation financing arrangements. The existing tax structure would not have to be changed. Airlines would pay the surcharge on top of the 8 percent ticket tax that makes up the bulk of the revenues of the Airport and Airways Trust Fund.

Establishing a surcharge, however, would perpetuate the inefficiencies stemming from the fact that existing fees do not reflect the costs of providing the necessary services. Because general aviation aircraft pay less than their costs under existing taxes, they would continue to receive a subsidy during off-peak periods. Moreover, sur-

charges would not correct any underpricing of airport landings and takeoffs during off-peak periods that results from the "residual pricing" method used at 60 percent of commercial airports.

Pricing Air Traffic Control. An alternative approach would be to price air traffic control services so that users would pay the full costs that their flights place on the aviation system. This would replace the existing aviation tax system with a system of true user fees. It would share the advantages of peak surcharges without many of their shortcomings. Prices for air traffic control would consist of two parts: one for en route services, and one for services during landings and takeoffs. FAA's in-flight services are not a major cause of congestion, and hence in-flight charges could be based on per mile or per flight sector fees for the necessary information and guidance.

At congested airports, charges for airport landings and takeoffs would reflect the costs of the controllers and equipment needed to handle the flights, as well as the delays imposed on other flights in the landing or takeoff queues. In other words, during congested periods fees would be established for a given time period so that the number of scheduled departures and arrivals did not result in unacceptable delays. In addition to varying by time of day, airport service charges would also reflect differences in the costs of handling different aircraft. At airports where noise is a concern, landing and takeoff prices could be based on the amount of noise the flights made.7/

As with surcharges, such price variations would tend to encourage a redistribution of traffic between peak and off-peak times and between busy and low-traffic airports. Over the longer term, they would tend to affect airline fleet choices so that airlines used the airway system more efficiently. These prices might also provide some indication of the value of expanding an existing airport or building a new one. Moreover, the pricing system would be a more equitable way of rationing access to existing capacity than current capacity management systems that determine who gets served according to the type of service.

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7. See, for example, David Graham, Daniel Kaplan, and Kathy Sharp, "A Proposal to Adopt Noise and Congestion Fees at Washington National Airport," unpublished paper, Civil Aeronautics Board (January 1981).

A major difficulty would lie in establishing the initial prices. Although FAA has had some experience in estimating the cost of providing its various services, it would be difficult to estimate the demand for landing and takeoff rights at a particular airport at a particular time. Once the prices were established, however, they could be adjusted upward when the number of flights exceeded capacity and adjusted downward when there was excess capacity.

One possible method of establishing initial prices would be to require carriers to bid for landing and takeoff rights at congested airports. The winning bidders would keep the relevant slots for some period of time, say six months. The prices established by those bids would be used to establish the landing fees. Such an auction could be devised so that winning bidders would pay the amount offered by the carrier with the highest losing bid. This procedure would encourage carriers to bid according to their true valuations of a slot; even if a carrier won, it would not have to pay as much as it bid.8/

Using landing fees to allocate capacity would ulimately result in the same number of operations at an airport as if slots were used. The two approaches would produce different results, however, if carriers suddenly wanted to increase service to an airport. If slots were held fixed, an increase in demand would increase their prices. There would not, however, be an increase in operations at the airport.

If the landing fees--that is, the prices of slots--were held fixed, an increase in demand would increase the number of takeoffs and landings. Thus, under a price rationing system there might be periods of congestion. But after landing fees were adjusted to reflect the greater demand, the congestion would disappear. Despite such periods of congestion, a fee system would be more efficient than a slot system because it would allow airlines far more flexibility to enter routes and adjust their schedules.

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8. For a discussion of the use of such an auction to allocate slots, see David Grether, R. Mark Isaac, and Charles Plott, "Alternative Methods of Allocating Airport Slots: Performance and Evaluation," prepared for Civil Aeronautics Board and Federal Aviation Administration, Polinomics Research Laboratories, Inc., Pasadena, 1978. A carrier with counter space and gates at a congested airport might find it necessary to reduce its operations. But there is an active secondary market through which it could sublease its excess facilities.

Another potential difficulty in administering a pricing system is that increases in landing fees would be likely to diminish service at a number of smaller communities. With the low levels of traffic on these routes, carriers might find that they were no longer able to earn an adequate return. To assure service to these routes, it might be necessary to establish special landing fees for such services.9/

9. Charging separate landing fees for different routes might be justifiable on economic grounds. See Severin Borenstein, "On the Efficiency of Competitive Markets for Operating Licenses," *Quarterly Journal of Economics* (May 1988), pp. 357-385. But since many passengers on these thin routes make connections, carriers serving denser routes might help secure the necessary landing rights. See Alfred Kahn, *Economics of Regulation*, Volume II (Santa Barbara: Wiley, 1970), pp. 234, 235.